Journal of Cleaner Production 202 (2018) 360–375

Contents lists available at ScienceDirect

Journal of Cleaner Production

journal homepage: www.elsevier.com/locate/jclepro

Climate justice and human development: A systematic literature review

Marcelo Wilson Furlan Matos Alves [a], Enzo Barberio Mariano [b, *]

[a] Federal University of Mato Grosso do Sul, Avenida Reitor Peró, Post Office Box 128, Nova Andradina, MS, Brazil
[b] State University of São Paulo, Av. Eng. Luís Edmundo Carrijo Coube, 14-01 - Vargem Limpa, Bauru, SP, Brazil

ARTICLE INFO

Article history:
Received 23 March 2018
Received in revised form
20 June 2018
Accepted 9 August 2018
Available online 23 August 2018

ABSTRACT

The objective of this paper is to carry out a systematic review of the literature on climate justice from the point of view of the capabilities approach. This review had as object of study 53 papers selected in the Web of Science and Scopus databases, and focused on the following dimensions: starting models for the preparation of action plans (Basic Rights, Polluter Pays, and Fair Division), types of actions adopted (adaptation and mitigation), level of adoption (macro and micro) and individual freedoms affected (economic, political, social, transparency guarantees and protective security). The main results and contributions of the study are: a) the Basic Rights model is more frequently used than the other two; b) there is a prevalence of some freedoms when analysed in the context of adaptation and mitigation actions; c) opportunity to apply quantitative methods and mixed methods on climate justice analysis; d) a theoretical framework organization of the concepts related to the link between climate justice and human development, which can help future research on the subject as well as contribute to the cooperation among academics and policy makers post-Paris Agreement.

© 2018 Elsevier Ltd. All rights reserved.

1. Introduction

Over the past two years, more than 160,000 scientific papers on climate change have been published on the *Scopus* and *Web of Science* databases in different areas of knowledge (Burkett et al., 2014). These studies, highlighted by the Intergovernmental Panel on Climate Change (IPCC), are restricted to the effects of greenhouse gases but also address climate-change mitigation/adaptation practices and techniques.

Amid this growing scientific advance, a topic that has gained ground is climate justice, which addresses complex ethical and moral issues (Sovacool, 2013) around climate-change adaptation and mitigation actions. This issue gained attention during the sixth UNFCCC Conference of the Parties (COP 6) in the Hague in the Netherlands (Schlosberg and Collins, 2014) in 2000 and is now seen as vital to debates on the impacts of climate change on individuals, as it combines academic, activism, and social justice aspects (Meikle et al., 2016). According to the Mary Robinson Foundation – Climate Justice (MRF, 2018), "Climate justice links human rights and development to achieve a human-centred approach, safeguarding the rights of the most vulnerable people and sharing the burdens and benefits of climate change and its impacts equitably and fairly." This definition is related to some academic papers that state the climate justice is focused on fair distribution of the burden of impacts of climate change and is understood and perceived to extend beyond pro-environmental behaviour to the climate impacts (Adger et al., 2017; Caney, 2014).

By searching for the keyword "Climate Justice" in the *Scopus* and *Web of Science* databases, more than 415 and 260 papers were obtained from each database respectively. Analysing these papers, it is seen that from 2008 on, there has been a considerable increase in the number of publications on the subject in both databases. This suggests that a systematic review of the literature on the subject may be important in order to shed light on possible future research paths.

Among the existing approaches to the theme of climate justice, Mayne et al. (2017) emphasize the capabilities approach as a possible guiding light for the United Nations (UN) Climate Convention discussions. It is emphasized that the capabilities approach, which was developed by the Indian economist Amartya Sen, is the basis for the human development concept, whose objective is to obtain the necessary freedoms so that individuals

* Corresponding author.
E-mail addresses: marcelo.furlan@ufms.br (M.W.F.M. Alves), enzo@feb.unesp.br (E.B. Mariano).

https://doi.org/10.1016/j.jclepro.2018.08.091
0959-6526/© 2018 Elsevier Ltd. All rights reserved.

can live in an adequate way (Schlosberg, 2009).

Since the capabilities approach supports the UN concept of human development (Peeters et al., 2013), it is not surprising that this theory is adequate to shape the definition of climate justice. In this way, climate justice can be defined as the guarantee of restoring the individual freedoms (or capability) after climate changes or any extreme climatic event through mitigation or adaptation actions (Comim, 2008; Lyster, 2017).

With this definition, the present paper identified the following gap in the literature on climate justice: what is the current state of the art on the topic of climate justice when analysed from the point of view of the capabilities approach?

According to Tranfield et al. (2003), the objective of a systematic review of the literature is to enable the researcher to map and evaluate the existing intellectual territory, specifying points of research that can improve the existing body of knowledge. Thus, the objective of this article is to carry out a systematic review of the literature in 53 publications that address the topic of climate justice from the point of view of the capabilities approach.

In Section 2, the article presents the scope of the theoretical concepts that will support the choices and examination of the selected papers. Then, in Section 3, the description of the adopted method is presented as well as the justifications for the selection of the works. Finally, the results are presented and discussed in Sections 4 and 5, respectively, and the conclusions of the paper are presented in Section 6.

2. Theoretical foundation

The term climate justice originated from another environmental concept, environmental justice (Schlosberg, 2012), which began to be discussed in the USA in the 1960s with the aim of ensuring that the black people and minority groups living on the outskirts of North American cities had the right to breathe fresh air, were less exposed to toxic waste, and had access to good-quality healthcare (Schlosberg and Collins, 2014). Over the years, as climate-change discussions intensified at the UN COPs and a number of climate-focused Non-Governmental Organizations (NGOs) emerged, the concept of environmental justice has evolved to climate justice (Meikle et al., 2016; Chatterton et al., 2013).

In order to understand all aspects of the relationship between climate justice and the capabilities approach, it is important to introduce some dimensions of analysis which are the basis for the theoretical framework presented at the end of this section. These dimensions include: (a) the starting model, (b) the type of action, (c) the levels of actions taken, and (d) the type of individual freedom affected by these actions.

We begin with the starting model, which can be defined as the different perspectives that guide the way to carry out climate-change adaptation and mitigation actions both globally and nationally. Thus, different starting models can have different effects on the freedoms of individuals. So, as explained by Schlosberg (2012), global discussions between NGOs, activists, and States revolve around three basic models: Polluter Pays, Fair Division, and Basic Rights.

The Polluter Pays model is based on the fact that, if the cause of climate change does indeed have an anthropogenic origin (IPCC, 2014), the developed nations, which due to their greater industrial development have brought us to the present crisis, must be responsible for paying the current costs of climate solutions (Schlosberg, 2012). Within this model, authors argue that rich nations must reduce their CO_{2Eq} emissions and simultaneously fund actions on adaptation to climate change in poor nations (Parks and Roberts, 2006; Roberts, 2009). However, other authors point to weaknesses in this model, since funding and mechanisms for transferring financial resources are not always effective in ensuring climate justice for the most vulnerable individuals (Scandrett, 2016).

An alternative is the Fair Division model, which deals with the individual's permission to emit CO_{2Eq} after the equal division of the "atmosphere's capacity". Thus, in this model the argument of "*carbon egalitarianism*" is established. The division of total greenhouse gas emissions can be per nation or per inhabitant of the planet (Schlosberg, 2012). In this model, there are studies on climate that objective to predict how nations strive to achieve their emissions targets (Holz et al., 2018). Also, there are theoretical studies that discuss the fair division of actions and consumption between different generations of individuals (Lewis, 2016) and fair alternatives for the division of benefits and weights in climate change mitigation (Bernstein, 2015; Blomfield, 2016).

Finally, the Basic Rights model focuses on the necessary rights, duties, and responsibilities to guarantee basic human rights (e.g. life, healthcare, and subsistence), even under environmental instability caused by climate change in individuals' lives (Schlosberg, 2012). In this line, there are articles that explore the guarantee of environmental balance to indigenous people (Norman, 2017; Scott and Smith, 2017), the impact of climate change on human rights (Bell, 2011), the guarantee of equal rights for women to adapt to climate change (Agostino and Lizarde, 2012), and the reformulation of climate agreements aiming to protect human rights (Dietzel, 2017).

In this paper, we assume that such models serve as a basis for the formulation of consistent adaptation and mitigation plans with the objective of increasing individual freedoms in the context of climate change. In this way, it is from the starting models (Polluter Pays, Fair Division, and Basic Rights) that the development of climate plans and the implementation of adaptation and mitigation actions will take place, according to the IPCC (2014, p. 76):

> "Adaptation and mitigation are two complementary strategies for responding to climate change. Adaptation is the process of adjustment to actual or expected climate and its effects in order to either lessen or avoid harm or exploit beneficial opportunities. Mitigation is the process of reducing emissions or enhancing sinks of greenhouse gases (GHGs), so as to limit future climate change."

Climate change mitigation and adaptation actions must be taken globally, nationally, and regionally with the aim of ensuring the defence of individual freedoms and consequently achieving climate justice (Barrett, 2012; Brooks and Davoudi, 2014; Vanderheiden, 2016). In this way, the dynamics of adaptation and mitigation actions begin at the global level (macro), for example, with the transfer of climate funds to countries that are at different stages of vulnerability and economic development (Roberts, 2009), including actions at national/regional (micro) level to ensure the provision of the required assistance to the most vulnerable individuals (Barrett, 2014) and a suitable environment for future generations (Gardiner, 2017; Otto et al., 2017).

It can be seen that adaptation and mitigation actions must be adopted at the macro and micro levels to guarantee individual freedoms in the context of climate change. Therefore, climate justice is guaranteed to individuals to ensure their capabilities and human development for a full life (Comim, 2008; Schlosberg et al., 2017). It should be stressed that the idea of a full life adopted in this paper is based on Amartya Sen's theory of social justice, which is used by the United Nations Development Program (UNDP) in its annual human development reports (Anand and Ravallion, 1993). According to the UNDP (2016, p. 1), human development can be defined as follows:

> "Human development is about enlarging freedoms so that all human beings can pursue choices that they value. Such freedoms have two fundamental aspects—freedom of well-being, represented by functionings and capabilities, and freedom of agency."

With this, it can be understood that guaranteeing climate justice also guarantees the human development of the individual. Thus, it becomes justifiable to use Amartya Sen's theory of social justice as a perspective for the analysis of the effects of mitigation and adaptation actions on each of the individuals' freedoms. Next, the five freedoms defined by Sen (2001) are described, and it is shown how they can be used to support the assessment of the impacts of adaptation and mitigation actions in guaranteeing climate justice.

The first type, Political Freedoms, refers to the rights and opportunities that individuals have to determine who should govern and based on what principles. Political rights associated with democracies open space for the individual to promote political dialogue, criticism, and the right to vote (Sen, 2001). In the climate change context, the right to a voice (Polack, 2008), to publicly express themselves (Finley-Brook and Holloman, 2016), and to choose their representatives based on environmental concepts (Sovacool et al., 2017) opens room for human development and ensures climate justice.

Economic Facilities are the opportunities individuals have to use economic resources for the purpose of consuming, producing, or exchanging. This freedom is related to the economic development of the nation, since with it the individual has access to new sources of income (Sen, 2001). For example, the development of renewable energy sources can create employment for individuals (Obama, 2017), providing income to help them act on their own to adapt to climate change (Running, 2015), as well as helping the most vulnerable individuals (Nicholas and Breakey, 2017), reducing their emissions through the conscious consumption of electric energy (Schlosberg and Collins, 2014), and protecting the environment (Platje and Kampen, 2016).

Social Opportunities refer to the provisions that society establishes in the areas of education and health, among others. Social opportunities give the individual the freedom to live better and facilitate the achievement of other types of freedoms, such as political freedom (Sen, 2001). By guaranteeing access to education, for example, the individual's awareness of the effects of climate change is enhanced and participation in discussions of climate policies (Kortetmäki, 2016) is maximized. Apart from this, if we observe the effects of climate change on the spread of diseases, such as dengue fever, (Costello et al., 2009), it is necessary to guarantee access to healthcare in order to make it possible for the individual to survive and adapt to climate change (Gutierrez and LePrevost, 2016).

Protective Security is necessary, since it is related to the guarantees that the State offers to individuals with a view to maintaining their integrity, making them less subject to misery, hunger, or even death (Sen, 2001). In this case, for example, national governments are expected to support immigrants with access to shelter and decent employment as a means to ensure their survival, since the places where they previously lived no longer allow them to live fully due to the severity of the climate (Skillington, 2015). Another expected support is that provided to children and adolescents after climatic disasters, since one of the consequences of these disasters is an increase in child trafficking for slave labour (Gibbons, 2014).

Finally, Transparency Guarantees refer to the need for honesty that people can expect and are linked to the role of fighting corruption, financial irresponsibility, and illegal transactions (Sen, 2001). Thus, in the context of climate change, it is possible to increase transparency among individuals and to support greater climate justice: to ensure government transparency in the use of financial resources coming from climate funds (Sheller and León, 2016) and to ensure clarity, ethics, and recognition of other nations at international climate conferences (Brincat, 2015).

Basically, the climate justice analysis should begin with the choice of a starting model, which will serve as the basis for the characterization of climate-change adaptation and mitigation actions. After this, it is necessary to check the level of adoption of these actions, whether it is global (macro) or national/regional (micro). Therefore, it becomes possible to understand whether or not the results of these actions are increasing the five types of individual freedoms of human development. Fig. 1 summarizes the theoretical concepts presented in this section of the article which were the basis of the criteria for the selection of papers for the systematic review.

It is understood that this framework for climate justice is the first contribution of this study, since it innovates in the organization of concepts that, so far, are little related in the literature. This framework can also ease the elaboration of future research and contribute to collaboration between academics and policymakers post-Paris Agreement (Ourbak and Tubiana, 2017).

In addition, understanding the concepts of climate justice from the point of view of the capabilities approach can provide a broader range of analysis of the impact of climate-change adaptation and mitigation actions on the life of the vulnerable individual, either in the elaboration of global guidelines or in the application of actions at the national/regional level. In fostering human development through climate-change adaptation and mitigation actions, the work also fosters climate justice for the individual.

3. Research method

The research method followed the steps defined in other systematic literature reviews (Mariano et al., 2015; Seuring and Müller, 2008; Jabbour et al., 2018) and the guidelines present in the work of Tranfield et al. (2003) in order to conduct the review work.

The steps are defined as follows:

- Step 1: Identification of the research need;
- Step 2: Evaluation of papers published in large databases using a set of pre-established keywords;
- Step 3: Selection of studies by reading their contents;
- Step 4: Development of a categorization and analysis system that represents the dimensions of the object studied;
- Step 5: Creation of quantitative tables of scientific production analysis and identification of opportunities in the area of study.
- Step 6: Identification, through content analysis, of new gaps and opportunities for future research on the topic.

The first step, identification of the research need, has already been justified in the introduction of this article, where its relevance to the theme of climate justice was highlighted.

The second step was the selection of databases, with *Scopus* and the *Web of Science* being chosen as they have the largest and most extensive collections of articles and publishers in the world (Danegelico, 2016) and have been used in several other systematic literature reviews (Lages Junior and Godinho Filho, 2010; Mariano et al., 2015).

The keywords used were selected based on academic publications and international reports on climate justice and human development. The term "*climate justice*" was chosen because it deals with the main theme of this paper, so all the searches done begin with the combination of this keyword and one more from the following: (a) "well being" and "welfare", taken from the study of

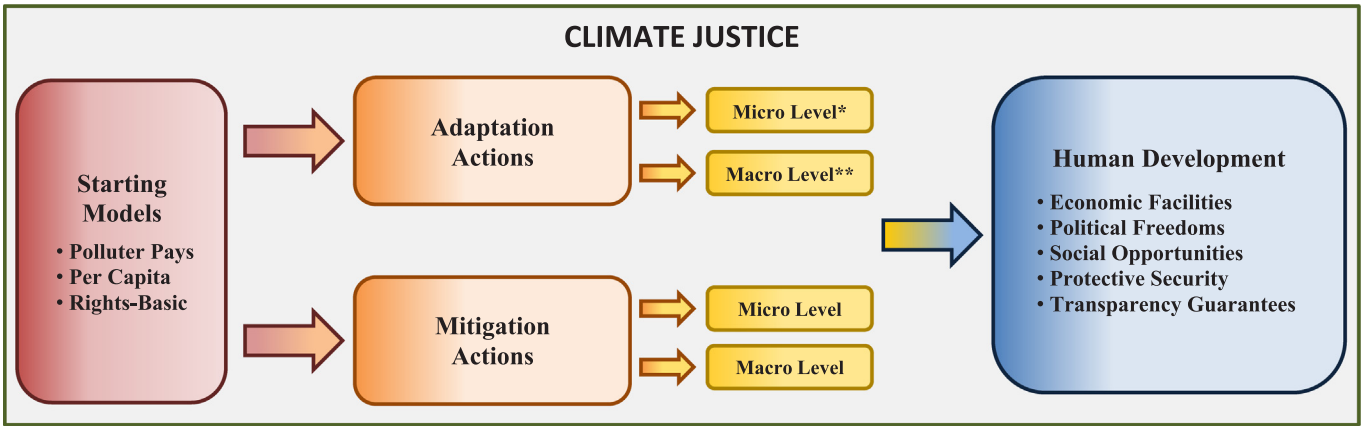

Fig. 1. Concepts of Climate Justice from the perspective of Capabilities Approach *Micro Level refers to actions at the National/Regional Level **Macro Level refers to actions at the International Level.

Mariano et al. (2015); (b) "capability", "capabilities", "freedom", and "human development", highlighted by Sen (2001); (c) "human-rights", selected from UNDP (2016); and (d) "vulnerability" or "vulnerabilities", taken from Burkett et al. (2014).

In addition to the keywords, another filter that limited the scope of searches was that only papers written in English were considered, because, according to Bocanegra-Valle's research (2014), publishing in English guarantees a large number of readers as well as a focus of research and opportunities for international cooperation and recognition.

Thus, in Step 3, eighty-four scientific papers on climate justice and human development were initially selected, all of them published prior to the end of August 2017. When they were read, some articles were discarded because they did not consider the full research topic, which is the relationship between climate justice and human development. Due to the restricted scope of analysis, papers that only aim the analysis of the mitigation actions by taxes and fees to reduce CO_2 emission and do not specify the relationship between climate justice and human development were excluded from the selection. Papers dealing only with ethics and morals in the context of climate change, animal welfare, speeches at events, and techniques of climate change analysis and those that did not include the full extent of the conceptual framework presented in Fig. 1 were also excluded from selection. At the end of the selection process, 53 scientific papers remained to be reviewed.

In Step 4, all selected papers were classified according to the scope variables presented in Fig. 1. After reading each one, the starting model used was identified, the types of actions were addressed, the level of analysis of these actions were addressed, and the types of individual freedoms were identified. The papers were also analysed using bibliometric variables and categorized as empirical studies (qualitative/quantitative) or theoretical/conceptual ones (Tranfield et al., 2003). They were also evaluated considering the region of the world from which the authors came, the journals that published them, the number of papers published per year, and the number of citations per paper selected. Table 1 summarizes the study variables used in this article, divided into bibliometric variables and scope variables.

Based on this classification, it was possible to generate information concerning the categories as well as to cross-check the data in order to better explore the results obtained. The quantitative analysis of the papers is presented in Section 4 and the content analysis is presented in Section 5.

4. Quantitative analysis

In this section are presented the quantitative results related to the bibliometric survey, the analysis of scope and the cross-referencing between the categories of the selected papers.

4.1. Bibliometric survey

The first analysis of the bibliometric survey carried out refers to the research method used in the selected works. It is seen that there is an almost equal division of papers according to the research method, and 49.06% of the 53 papers used some empirical research method to show climate-change adaptation or mitigation actions in different nations/regions of the planet, while the other 50.94% sought to use theoretical/conceptual constructions in order to better understand and debate the issues of climate justice with regard to rights, social justice, and consequences of adaptation and mitigation actions.

Therefore, it is understood that there is still room in the literature on climate justice for both the search for empirical evidence and the definition of concepts and delimitation of topics.

G1. . Improve the definitions and delimitations of the climate justice theme as a way of supporting new empirical and theoretical studies in the area.

The classification of authors per region of the selected studies shows a certain disparity. This classification occurred as follows: each author of a paper was counted only once even if the same author had published two or more papers. Researchers on climate justice are concentrated in Europe and North America: 47.17% of the 53 articles have at least one European and 37.74% at least one North American researcher. Despite the presence of five researchers (9.43%), Oceania contributes four articles in which the same researcher, David Schlosberg from the University of Sydney, participated. The other three regions of the planet, Africa, Asia, and Latin America respectively, account for 3.77, 1.89, and 9.43% of researchers among the selected articles.

We can see a strong concentration of European and North American researchers engaged in climate justice and human development research, which may indicate the presence of research centres in the area and the strengthening of partnerships with researchers from less represented regions. Table 2 shows the results per region of the authors of the studies and then highlights

Table 1
Summary of study variables.

Bibliometric analysis		Scope analysis	
Variable	Categories	Variable	Categories
Research Method	Empirical Study (Qualitative/Quantitative)	Starting Model	Polluter Pays
			Per Capita
	Theoretical/Conceptual		Basic Rights
Regions of the Studied Authors	Europe	Types of Actions Taken	Adaptation Actions
	North America		Mitigation Actions
	Oceania	Level of Actions Taken	Micro Level (National/Regional)
	Latin America		Macro Level (Global)
	Africa	Types of Individual Freedoms	Economic Facility
	Asia		Political Freedom
Journals	–		Social Opportunity
Citations	–		Protective Security
Publication per year	–		Transparency Guarantee

Table 2
Regions of the studied authors.

Regions of the Studied Authors	Number of Authors	Porcentage
Europe	26	47,17%
North America	20	37,74%
Oceania	5	9,43%
South America	5	9,43%
Africa	2	3,77%
Asia	1	1,89%

two research opportunities.

G2. . Promote research on climate justice and capabilities in developing and underdeveloped countries;

G3. . Encourage the exchange of researchers from developing countries with those from developed countries in order to enrich the field of study on climate justice.

Another bibliometric survey conducted deals with the number of articles selected by scientific journal. In all, 37 journals were identified, of which only the eight with the greatest number of selected papers are highlighted in Table 3. The first two journals with more articles selected were *Geoforum* and the *International Journal of Climate Change Strategies and Management* (*IJCCSM*) with six and five articles, respectively. These two journals published special editions on climate justice in 2016, with the themes "*Climate Justice and the Caribbean*" and "*Climate Justice*", respectively. Only one article per journal was selected from the remaining 29 journals by the searches. This result may indicate two possibilities: either the theme is still dispersed in the literature and needs a deeper scope of analysis or, because it is linked to several areas of study, the theme tends to fit into the environmental and social scope of several scientific journals. The following opportunity may indicate to researchers in the subject ways to communicate their studies.

G4. . To monitor the progress in the definition of concepts on climate justice in order to help future researchers find journals that have scope for the communication of research on the theme.

The next bibliometric analysis deal with citation by paper selected. Table 4 highlights the papers that have more than four citations up to the moment of publication of this article. It can be seen that Schlosberg work (2013) has 110 citations. It deals with the evolution of the environmental justice concepts, the emergence of the climate justice concepts, and the consequences of climate change for the vulnerable individual. The article delimits the

Table 4
Number of citations per Paper.

Paper	Citations
Schlosberg (2013)	110
Abate (2010)	41
Newell and Mulvaney (2013)	40
Bulkeley et al. (2013)	31
Schlosberg (2012)	24
Grineski et al. (2012)	19
Figueiredo and Perkins (2013)	18
Forsyth (2014)	17
Schlosberg and Collins (2014)	16
Barrett (2012)	14
Peeters et al. (2013)	11
Gough (2015)	11
Barrett (2014)	9
Finley-Brook and Holloman (2016)	7
Gibbons (2014)	7
Dreher and Voyer (2015)	6
Polack (2008)	5
Sovacool et al. (2017)	5
Comim (2008)	4
Gutierrez and LePrevost (2016)	4
Creutzig et al. (2014)	4
Wilson (2016)	4
Bendlin (2014)	4

Table 3
Number of papers per journal.

Journal	Number of Papers	Percentage
Geoforum	6	11,32%
International J. of Climate Change Strategies and Management	5	9,43%
Environmental Politics	3	5,66%
Climatic Change	2	3,77%
Development	2	3,77%
Ethics, Policy & Environment	2	3,77%
Global Policy	2	3,77%
International J. of Environmental Research and Public Health	2	3,77%
Others	29	54,72%

subject in question, becoming an almost mandatory reference for the theme.

The last bibliometric survey carried out concerns the quantity of publications per year. In Table 5, it can be seen that after the year 2013, the number of publications dealing with climate justice and human development grows year on year. This result might be consequence of the publication of the special issues by *Geoforum* and *IJCCSM* and the term climate justice be defined by academics in the literature as Schlosberg work (2013).

4.2. Classification of scope of analysis

4.2.1. Survey via scope of analysis

In this section, the classification of the papers selected according to the framework in Fig. 1 is presented. Table 6 presents, for each selected paper, the starting model used (Polluter Pays, Fair Division, or Basic Rights), which type of action (climate-change adaptation and/or mitigation), and the perspective level used [macro (global) and/or micro (national/regional)]. The references and arguments that the authors used from the point of view of the capabilities approach according to the five freedoms of Sen (2001) were also highlighted in each article: Economic Facilities, Political Freedoms, Protective Security, Social Opportunities, and/or Transparency Guarantees.

The starting model—the first category—presented a discrepancy in the results. It is worth emphasizing that the models do not exclude each other and therefore some papers used more than one model as a point of analysis of climate-change mitigation and adaptation actions. Thus, the model most frequently used by the authors was the Basic Rights model, with 45 papers, followed by the Polluter Pays and Fair Division models, with 11 papers each. This result may prove that the guarantee of Basic Rights to the individual is more relevant to the concept of climate justice as defined in this article, which relates it to human development. The following opportunity may indicate new studies in the area.

G5. Understand and relate other perspectives of analysis with the concepts of human development, not only to aim at guaranteeing basic rights to the individual.

It is worth mentioning that of the 53 articles: (a) 35 adopted only the basic rights model (66.04%), (b) four only the polluter pays model (7,55%), (c) four only the fair division model (7,55%), (d) three only the polluter pays and basic rights models (5,66%); (e) three the fair division and basic rights models (5,66%); and (f) four all three starting models (7,55%).

In the second part, an analysis of whether the papers focused on climate change adaptation or mitigation actions was conducted, and again, it can be seen that some authors analysed both actions. The articles tend to concentrate slightly on adaptation actions in this category, which corresponds to 27 papers (50.94%) out of 53. Twelve (22.64%) of the papers analysed mitigation actions and 14 (26.42%) analysed both types of actions. This result may indicate that mitigation actions still require studies and further discussions on how they can contribute to climate justice from the perspective of the capabilities approach. On the other hand, and perhaps by their nature, adaptation actions may indicate a safer way to search for empirical evidence on the impacts of climate change on an individual's life. The following opportunity systematizes the results found by this analysis.

G6. Promote studies on mitigation actions as a way to guarantee climate justice and increase the capability of the individual in the context of climate change.

Regarding the third analysis—the macro or micro level of action—the data indicate that the global (macro) perspective was used in 26 of the 53 selected papers (59.06%), while the national/regional (micro) perspective was used in 19 (35.85%) and multiscale analysis in eight (15.09%). Despite the difference between the macro and micro levels, it is believed that climate justice issues should preferably consider both perspectives of analysis. The following opportunity may indicate new research paths when using both macro and micro levels in the theme of climate justice.

G7. Report evidences of the adoption of climate-change adaptation and mitigation actions from both global and national/regional perspectives.

Finally, the analysis of the five freedoms based on the capabilities approach presented interesting results on the impact of climate change on the individual's life. Protective Security was identified in 35 papers (66.03%), Social Opportunities in 34 (64.15%), and Economic Facilities in 32 (60.37%). These were closely followed by Political Freedoms, identified in 25 papers (47.16%), and Transparency Guarantees, identified in 12 (22.64%). It is understood that the three most frequently identified freedoms in the studies on climate justice and human development tend to quickly meet the basic needs of individuals in cases of climate change, while the other two have more indirect effects; this may help to explain why the first three tend to appear more frequently. Given this, the following opportunity may indicate new avenues for future research.

G8. Understand whether or not there is a difference of importance in the types of freedoms for the promotion of climate justice.

4.2.2. Cross-checking scope of analysis

By analysing the data by cross-category, new perspectives on the selected papers can be reached. As the objective of this article is to understand the state of the art on the theme of climate justice and human development, it is relevant to perform a cross-analysis by group of categories presented in Fig. 1.

Thus, the relationship between the starting models (Polluter Pays, Fair Division, and Basic Rights) and climate-change mitigation and adaptation actions is verified first. This relationship is observed a predominance of papers that use the Basic Rights model to analyse adaptation actions, corresponding to 25 (55.56%) of the 45 papers. Then, the combination of the Basic Rights model with mitigation actions appears in 11 papers (37.74%).

These results may indicate that research has made it easier to evidence and understand through adaptation actions what basic rights are needed so that vulnerable individuals can lead an adequate life in the context of climate change. However, it can be pointed out that the other perspectives, even if represented by a lower percentage, can still be used in studies on climate justice. Table 7 presents the results of this analysis and the opportunity

Table 5
Publications of papers per year.

Year	Quantity of papers	Percentage
2008	2	3,77%
2009	0	0,00%
2010	1	1,89%
2011	0	0,00%
2012	5	9,43%
2013	5	9,43%
2014	7	13,21%
2015	11	20,75%
2016	14	26,42%
2017	8[a]	15,09%

[a] Number of publications up to August 2017.

Table 6
Classification of papers according to scope of analysis.

Selected Articles versus Scope Analysis Categories	Starting Model			Types of action		Action level		Individual Freedons				
	Polluter Pays	Fair Division	Basic Rights	Mitigation	Adaptation	Micro Level	Macro Level	Economic Facilities	Political Fredooms	Protective Security	Social Opportunities	Transparency Guarantees
Abate (2010)			✓		✓	✓	✓					
Agostino and Lizarde (2012)			✓		✓		✓	✓	✓		✓	
Ahmed (2016)			✓	✓	✓	✓	✓	✓	✓	✓		
Baptiste and Kinlocke (2016)			✓		✓	✓	✓			✓		
Barrett (2012)		✓			✓	✓	✓			✓	✓	
Barrett (2014)			✓		✓	✓		✓	✓	✓	✓	✓
Bendlin (2014)			✓	✓			✓	✓		✓		
Bernstein (2015)		✓		✓	✓		✓			✓		
Brincat (2015)			✓	✓	✓		✓			✓	✓	✓
Brooks and Davoudi (2014)	✓			✓	✓	✓				✓	✓	
Bulkeley et al. (2013)			✓	✓	✓	✓				✓		✓
Cameron and Limon (2012)			✓		✓				✓		✓	✓
Comim (2008)			✓		✓		✓			✓	✓	
Creutzig et al. (2014)		✓		✓			✓	✓				
Dietzel (2017)			✓	✓	✓				✓			
Dreher and Voyer (2015)			✓		✓		✓	✓	✓			
Figueiredo and Perkins (2013)			✓		✓	✓			✓	✓	✓	
Finley-Brook and Holloman (2016)			✓	✓		✓		✓	✓	✓		
Forsyth (2014)		✓		✓	✓		✓	✓				
Gibbons (2014)		✓	✓		✓	✓	✓	✓	✓	✓		
Gough (2015)			✓	✓	✓				✓	✓		
Grineski et al. (2012)			✓		✓	✓				✓	✓	
Gutierrez and LePrevost (2016)			✓	✓	✓	✓				✓	✓	
Jafry (2016)			✓		✓	✓	✓	✓		✓		
Johannessen (2013)	✓			✓	✓		✓	✓	✓	✓		
Kortetmäki (2016)			✓		✓		✓			✓		
Lewis (2016)		✓	✓	✓	✓	✓	✓			✓		
Lyster (2017)	✓				✓		✓		✓	✓	✓	✓
Mayne et al. (2017)	✓	✓	✓	✓		✓			✓	✓		
Mckinney and Fulkerson (2015)	✓		✓	✓			✓	✓	✓			
Meikle et al. (2016)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓
Newell and Mulvaney (2013)	✓		✓	✓		✓	✓	✓	✓		✓	
Nicholas and Breakey (2017)			✓	✓	✓		✓		✓	✓		
Otto et al. (2017)			✓		✓		✓		✓	✓		
Peeters et al. (2013)			✓	✓			✓					
Platje and Kampen (2016)			✓	✓			✓	✓	✓	✓	✓	
Polack (2008)			✓		✓	✓	✓		✓	✓		
Popke et al. (2016)			✓		✓	✓	✓			✓		
Running (2015)	✓			✓	✓	✓		✓	✓		✓	
Saab (2015)			✓		✓		✓	✓				
Schimidt and Schäfer (2015)	✓	✓	✓	✓			✓	✓	✓		✓	✓
Schlosberg (2012)			✓		✓		✓	✓		✓		
Schlosberg (2013)			✓		✓		✓			✓	✓	
Schlosberg and Collins (2014)			✓		✓	✓	✓	✓	✓	✓	✓	✓
Schlosberg et al. (2017)			✓		✓	✓	✓		✓	✓		
Shaw (2016)	✓	✓	✓	✓		✓	✓	✓		✓	✓	
Sheller and León (2016)	✓		✓		✓	✓	✓		✓		✓	✓
Skillington (2015)			✓		✓		✓	✓	✓	✓	✓	
Smith and Rhiney (2016)			✓		✓	✓	✓	✓	✓	✓		
Sovacool et al. (2017)		✓	✓	✓		✓		✓	✓	✓	✓	✓
Vanderheiden (2016)			✓	✓		✓		✓	✓		✓	✓
Wilson (2016)			✓		✓	✓	✓		✓			
Zellentin (2015)			✓		✓		✓				✓	

presented below shows a possible path for future research.

G9. Report cases where the Basic Rights perspective is used to analyse climate-change adaptation and mitigation actions, verifying whether the consequences of both actions for the freedom of the individual are similar.

A second analysis that related the mitigation and adaptation actions to macro (global) and micro (national/regional) perspectives is shown in Table 8. The papers tend to analyse the actions of adaptation to climate change at the macro level (20 out of 41) and the micro level (16 out of 41). These results may indicate that adaptation actions have been frequently analysed both in comparisons between countries (macro level) and internally (micro level). With regard to mitigation actions, it is understood that, because most deal with the reduction of greenhouse gas emissions, there is a greater tendency to study and understand them globally (macro level). The opportunities presented below indicate the possible paths in the relationship between the type of action and the level of adoption.

G10. Identify the differences and similarities in the adoption of ***adaptation*** actions in developed and developing countries (macro level), verifying which adjustments are made in this type of action to achieve climate justice in the various regions of the countries

Table 7
Starting models *versus* actions.

Starting Models	Amount	Actions	Amount	Percentage
Polluter Pays	11	Mitigation	5	45,45%
		Adaptations	2	18,18%
		Both	4	36,36%
Fair Division	11	Mitigation	5	45,45%
		Adaptation	2	18,18%
		Both	4	36,36%
Basic Rights	45	Mitigation	11	24,44%
		Adaptation	25	55,56%
		Both	9	20,00%
Total	67[a]	Total	67	100%

[a] Four papers addressed the three models and six addressed two.

Table 8
Types of action *versus* level of action.

Types of Action	Amount	Level of Action	Amount	Percentage
Mitigation	26	Macro	14	53,85%
		Micro	8	30,77%
		Both	4	15,38%
Adaptation	41	Macro	20	48,78%
		Micro	16	39,02%
		Both	5	12,20%
Total	67[a]	Total	67	100%

[a] Fourteen articles address the two type of actions.

(micro level).

G11. Identify the differences and similarities in the adoption of ***mitigation*** actions in developed and developing countries (macro level), verifying which adjustments are made in this type of action to achieve climate justice in the various regions of the countries (micro level).

The next analysis refers to the relationships between mitigation and/or adaptation actions and the five individual types of freedoms. The analysis was carried out in a simple way, counting how many times each freedom was mentioned when the mitigation or adaptation actions were mentioned. When observing the cross-checking of such categories, it is seen that for the adaptation actions, three of the five types of freedoms, namely economic facilities, protective security, and political freedoms, are mentioned with similar frequencies. A possible explanation for the fact that three of five freedoms stand out in this category is that the literature on the subject still lacks studies that involve the effects of political issues and transparency in the adoption of adaptation actions.

G12. Promote further studies on the effects of political freedoms and transparency guarantees on adaptation actions.

On the other hand, observing the frequencies related to the mitigation actions, it is seen that the Political Freedoms appear a similar number of times to the other three, which can be explained by the fact that mitigation actions are still discussed both globally and nationally, so it is necessary to guarantee freedom of speech and voice to discuss the consequences of such actions. Table 9 below shows the frequencies verified from the type of action and individual freedoms treated in the papers.

5. Content analysis

This section of the article aims to present the gaps in the literature as well as suggest future research opportunities from the content analysis of the 53 selected papers that deal with the entire scope of analysis presented in Fig. 1.

Table 9
Types of actions *versus* types of freedoms.

Types of Actions	Amount	Types of Freedoms	Amount	Percentage
Mitigation	26	Economic Facilities	15	57,69%
		Political Freedoms	14	53,85%
		Protective Security	17	65,38%
		Social Opportunities	16	61,54%
		Transparency Guarantees	6	23,08%
Adaptation	41	Economical Facilities	23	56,10%
		Political Freedoms	16	39,02%
		Protective Security	28	68,29%
		Social Opportunities	28	68,29%
		Transparency Guarantees	9	21,95%
Total	67[a]	Total	67	100%

[a] Fourteen articles address the two type of actions.

5.1. Starting model

The first analysis of the 53 selected papers discusses the starting model (Polluter Pays, Basic Rights, or Fair Division) as the perspective for guaranteeing climate justice. In this way, the articles that seek to use the starting model Basic Rights stand out and aim to understand both climate-change adaptation and mitigation actions.

From the content analysis, it has been identified that the effects on the individual's basic rights are not clearly understood when a nation adopts adaptation and mitigation actions, which are probably taken simultaneously. A first noteworthy study is that of Gough (2015), which analyses the concept of human need and argues that it must take into account the distribution of actions and damages, establishing the responsibilities of each individual with regard to his or her performance in national terms. For his part, Lewis (2016) argues that current generations must take action to mitigate and adapt to climate change taking into account their effects on the basic rights of future generations. Dietzel (2017) analyses the limitations in terms of basic healthcare rights, arguing that both mitigation and climate adaptation actions are necessary to ensure climate justice.

What literature has sought to understand is the importance of guaranteeing basic rights through climate-change mitigation and adaptation actions. It remains to report what the effects are on the basic rights of the individual and whether or not the effects of these types of actions overlap. The following opportunities in the literature are identified:

G13. How does the adoption of adaptation and mitigation actions take place in order to guarantee basic rights to individuals in a nation?

G14. Do the effects of such actions overlap or not, considering their joint adoption?

5.2. Types of actions

5.2.1. Adaptation actions

We started by analysing papers that used an empirical approach to report climate adaptation actions. In this group we can highlight Brooks and Davoudi (2014), who compared the energy policies of China and the UK regarding access to electricity with low CO_2 emissions by people on low incomes. Gutierrez and Leprevost (2016) the effects of climate change on individuals' health in rural areas of the USA. The media analysis was studied by Schimidt and Schäfer (2015), Johannssen (2013), and Dreher and Voyer (2015) in order to map the news that was disseminated during the COPs of the UN and during extreme climate events. Finally, the special issues of the journals *Geoforum* and *IJCCSM* aimed to report the

situation in the Caribbean, Africa, and Southeast Asian countries regarding adaptation actions.

These studies, however, did not provide an indication of which actions should be prioritized in developing countries in order to guarantee to the individual greater ability to survive climate change. It seems difficult to identify which freedom is the most important to enable the individual to survive an extreme weather event and whether it varies according to the nation, even if it is developed. Thus, the following opportunities in the literature were identified:

G15. Is there a pattern of climate-change adaptation actions that should be prioritized in developing countries?

G16. Should the same adaptation actions be prioritized or should they be adapted to the context of developed countries?

Still within this group of papers are those that sought to measure climate justice from different perspectives. Running (2015) used a statistical analysis to show the existing dilemmas in the life of the individual when exposed to questions about environment and income donation; this analysis used variables such as family income, level of education, democracy, and access to healthcare. Barrett (2014) analysed the distribution of climate transfer funds in Malawi, while Grineski et al. (2012) verified whether there is a difference between two border cities located between Mexico and the USA. McKinney and Fulkerson (2015) applied a model of structured equations relating to the gross domestic product, level of urbanization, gender equality, and carbon footprint of 150 countries in the world.

These papers sought to explore the field of study on climate justice as well as the first existing relationships within this theme. It is believed that it is relevant for the literature to measure the impact of adaptation actions on human development and their effectiveness to ensure climate justice through specific case reports where quantitative data are reinforced by qualitative data. Therefore, there is an opportunity to study the application of other quantitative methods to understand the effects of climate-change adaptation actions.

G17. Intensify and apply different quantitative methods in order to evaluate and understand the effectiveness and efficiency of climate-change adaptation actions as well as the characteristics of the community/region/country benefited.

G18. Is it possible to use mixed methods to evidence climate-change adaptation actions?

A second group of studies relates theoretical studies and adaptation actions, among which we highlight the work of Barrett (2012), who suggests the use of multiscale analysis in the distribution of funds for adaptation actions. Schlosberg and Collins (2014) deal with the advancement of the terminology from “environmental justice” to “climate justice”, analysing the impacts suffered and the process of adaptation of communities in the climate context. Lyster (2017) argues that the capabilities of individuals are key parts for the transfer of resources from the agreements established by the UN.

It is observed that the studies seek to understand the different situations existing between the individual and the adaptation actions in order to ensure climate justice. It is then necessary to analyse how these adaptation actions contribute to the increase of the individual's capability that is the basis of the UN guidelines for human development. From this result, it is identified the need to elaborate and model the actions of adaptation to climate change through national public policies considering the directives and goals of human development of the UN. Thus, the identified opportunity is:

G19. How can climate-change adaptation actions be adopted so that they are aligned with UN human development guidelines and goals to ensure the needs of communities/individuals in different countries around the world?

5.2.2. Mitigation actions

In terms of empirical and theoretical studies that have analysed the adoption of climate-change mitigation actions, we can mention that of Bendlin (2014), which states that the climate-change mitigation actions can affect the human rights of women and girls, and because of that it is up to national policies to guarantee participation rights in climate discussions, access to electricity, and other rights. Platje and Kampen (2016), in turn, analyse the climate-change mitigation potential of actions by a group of countries to ensure climate justice for the most vulnerable ones. And in a more radical way, Peeters et al. (2013) argue that in order to meet greenhouse gas emission limits and ensure sustainable development, it is necessary to limit the functioning and capability of individuals to consume goods and services.

Studies in this category seek to provide elements on how mitigation actions can affect individuals' rights and what are the first alternatives found to prevent increases in CO_2 emissions. However, when promoting mitigation actions, attention must be paid to the fact that while the capability of individuals must be increased, the consequences of their choices must be less polluting. So, it is important to ensure that individuals have the capability to mitigate climate change without losing their ability to live proper and fulfilling lives. Thus, the opportunities identified in the literature on mitigation actions are as follows:

G20. How can mitigation actions be promoted at national and global levels, respecting and guaranteeing the capabilities of individuals for full lives and giving them the opportunity to make less polluting choices?

G21. Look for specific cases of mitigation actions that ensure climate justice for the most vulnerable individuals in both developed and developing countries.

5.3. Individual freedom

5.3.1. Economic facilities

The first freedom to be addressed is the Economic Facilities, and its relation to mitigation actions, which is mainly related to the creation of jobs through the generation of renewable energy. The literature has given a lot of attention to the possibilities of employment generation through the adoption of renewable energies. However, something that still needs to be better explored is the fact that the creation of jobs through the generation of renewable energies will not necessarily give the individual the opportunity to acquire this same source of energy.

In this way, Newell and Mulvaney (2013) mention the possibility of job creation through the adoption of clean energy in low-income communities with the possibility of fighting the use of slave labour. Similarly, Finley-Brook and Holloman (2016), Schlosberg and Collins (2014), and Creutzig et al. (2014) debate about the opportunity to create jobs when introducing new technologies to reduce CO_2 emissions and the importance of awareness that is reached through training for saving energy, without reporting situations in which individuals have begun to have more freedom as a result of their work.

In this way, it is unclear whether guaranteeing employment through the adoption of renewable energy sources is sufficient for

individuals to be able to choose their energy source, and moreover, whether they will be less vulnerable to extreme climate events without a chance of being in a power outage condition for a long time. Therefore, a opportunity observed by this article refers to the need to understand and report how job creation through the adoption of renewable energies guarantees economic freedom to the individual so that he or she can act in favour of CO_2 reduction.

G22. Search for case reports on how job creation has occurred through the adoption of renewable energy in both developed and developing countries.

G23. Search for case reports on how this freedom can contribute to increasing the capabilities of the individual to save and choose his or her energy source and, consequently, become an agent for the mitigation of climate change.

Regarding the relationship between the adoption of adaptation actions and Economic Facilities, it can be seen that economic development can minimize the impacts of extreme climate events on present and future generations and on individuals who need to adapt after migrating to another country or region.

Running (2015) suggests that policies be created to raise awareness among individuals regarding the fact that their financial condition is a source of adaptation to climate change. Smith and Rhiney (2016), Wilson (2016), and Popke et al. (216) point out that small farmers cannot get government help to produce food, which makes their access to central markets difficult. Otto et al. (2017) describe the situation of immigrants who obtain the worst jobs and low income levels, making it difficult for them to adapt to climate change.

However, case reports on vulnerable countries that present weaknesses in their economies, which affect individuals' abilities to act on their own, can be seen in the literature. It is understood that case reports in developed countries may also be relevant in order to verify how the economic development of a nation is able to guarantee financial resources so that individuals can adapt to climate changes and to understand why they seek to migrate to more developed nations even though not all of their basic rights (e.g., political rights) will be guaranteed.

G24. How can the economic development of a nation contribute to increasing the ability of the most vulnerable individuals to adapt to climate change?

G25. Why does economic freedom take priority over other types of freedoms when analysing migration?

5.3.2. Social opportunities

Regarding Social Opportunities, this freedom refers to issues such as access to water, housing, information, healthcare, energy, and education. These themes were combined into two groups, the first one dealing with housing, healthcare, and access to water. It is understood that these themes have in common the fact that they are essential for the individual's adaptation actions. However, it is still unclear whether, by being granted such basic rights, the individual will be able to promote other adaptation actions and reduce his or her vulnerability or whether he or she will remain only a recipient of such opportunities.

The results in Barrett (2014) show that there is a positive statistical relationship between life expectancy and access to climate funds transferred to Malawian regions, without highlighting how these funds are used in adaptation actions. Grineski et al. (2012) show that the lack of access to healthcare is related to vulnerability due to floods in certain areas of US and Mexican cities, without specifying how the individual acts on his or her own in situations of vulnerability. Gibbons (2014) states that after extreme weather events, children from vulnerable countries seek drinking water and shelter as higher priorities; however, the impacts of these actions on human development are not observed.

Thus, what is seen in the literature is the influence of extreme events on the life of the individual who seeks to survive climate change. However, it is understood that it is necessary to understand whether individuals who have such social opportunities are able to promote climate-change adaptation actions and to what extent such social opportunities reduce their climate vulnerability.

G26. Does the individual who has access to drinking water, safe housing, and healthcare make better choices about adopting climate-adaptive actions or continue to passively receive such opportunities?

G27. How should the social guarantee policies be implemented for individuals and what is the effectiveness in reducing their vulnerability to climate change?

The second set of themes relates to social opportunities concerning education, information, energy, and infrastructure. It is understood that having access to opportunities to study, being informed, moving around, and having access to energy are ways for the individual to increase his or her capabilities and thus to adapt to and mitigate climate changes. However, although the literature emphasizes the importance of such social opportunities to guarantee climate justice, there is still a lack of empirical evidence about how the increase in the individual's capability has an effect on climate-change mitigation and adaptation actions.

Sovacool et al. (2017) reinforce the argument that individuals need to have access to information and education, among other factors, to exercise their social roles in the context of climate, but the authors delimit their study by analysing various existing injustices in energy issues and do not exploit the consequences of diminishing them. Otto et al. (2017) report that the lack of infrastructure in developing countries makes their inhabitants more vulnerable to the impacts of climate change, highlighting how the capability of the individual is harmed by climate change, without analysing the effects of these social opportunities on the individual's ability to act by him or herself. Gough (2015) states that allowing individuals to understand their culture and what is expected of them in terms of skills and competencies enables them to act autonomously in the context of climate change; this author, however, did not advance the understanding of how these skills and competences contribute to the increase of this autonomy.

Thus, the opportunity identified in the literature concerns the degree to which these social opportunities (education, infrastructure, information, and energy) increase the individual's ability to act in the context of climate change.

G28. Report more cases where access to education, infrastructure, and information has increased the individual's ability to adapt to and mitigate climate change.

G29. Is there a causal relationship between the choices of the individual based on his or her education opportunities, infrastructure, and information and the search for climate justice?

5.3.3. Protective security

The third freedom presented is the "*Protective Security*", which relates to the guarantee of survival that national governments offer their inhabitants and is largely debated in the papers.

This theme tends to recur more frequently due to the fact that climate-vulnerable people need more assistance in surviving extreme weather events. Schlosberg (2012) states that

governments should use data from health agencies, emergency management, agricultural stations, and researchers to track and understand how climate changes affect the capabilities of individuals. Barrett (2014) argues that the financial resources of climate funds reduce the vulnerability of the individual by providing food and water supply. Likewise, Lyster (2017) also states that vulnerable countries do not have the ideal financial conditions to protect their inhabitants, since climate tragedies can generate costs of over US$ 18 billion.

However, it is observed that guaranteeing financial assistance to the individual after extreme weather events will guarantee neither his or her human development nor climate justice, and it is necessary to understand whether such financial resources are sufficient to remove the vulnerable individual from the risk situation, increasing his or her capability. Therefore, the opportunities identified in the literature concern the understanding of the influence of financial resources on the survival of vulnerable individuals and whether these resources will enable the individual to adapt to climate changes before extreme events occur.

G30. Has protective security related to financial resources had a positive impact on the survival of climate-vulnerable individuals?

G31. How effective is this kind of freedom for climate-change adaptation actions?

Protective Security refers to some items such as water, shelter, and energy, which are seen as social opportunities can become so critical that there is a need to guarantee them to individuals. Skillington (2015) states that immigrants are highly vulnerable because they leave their countries without any guarantee of shelter in the country of destination, remaining vulnerable to climate. Cameron and Limon (2012) argue that human rights must be the basis for adaptive action in response to climate change, protecting individuals from early death and migration and ensuring their survival through healthcare, mobility, and a fair standard of living. Brooks and Davoudi (2014) state that the alternatives offered by the state to enable individuals to maintain the heating of their homes are seen as essential for their survival in more severely cold places.

Therefore, it is observed that there is in the literature a second line related to protective security that deals with the guarantee of basic non-financial resources for the survival of the individual in the context of climate change. These studies, however, do not put into perspective these resources in comparison to financial resources. The opportunity identified in the literature concerns whether protective security should occur through financial resources from climate funds, for example, or by the direct provision of basic resources such as water, shelter, and energy.

G32. Is the protective security of water, shelter, and energy more effective than the one related to financial resources for the survival of the vulnerable individual?

G33. Should developed countries promote the transfer and implementation of basic resources to ensure climate justice for vulnerable individuals in developing nations or should they continue to transfer financial resources to climate funds?

5.3.4. Political freedoms

Regarding Political Freedoms, the first discussion revolves around the political rights and representativeness of the individual in national and international debates and meetings on adaptation to and mitigation of climate change. Although the literature presents papers that emphasize the importance of such freedom, it is not clear how the mechanisms of guaranteeing the participation and voice of the individual should be changed in order to have greater engagement.

As the result of their work, Schlosberg et al. (2017) found that the basic needs identified in the speeches of individuals are different from the actions taken by local governments; the study, however, does not explain whether such a discrepancy between speeches and actions happens due to lack of representativeness or lack of recognition. Similarly, Vanderheiden (2016), Gibbons (2014), and Meikle et al. (2016) argue that there is a need for greater representativeness in global discussions on climate change, which can be done by inserting children and young and elderly people into discussions on climate-change mitigation and adaptation actions.

The literature on climate justice seeks to explain this absence of the individuals in discussions and definitions of climate policies through the lack of recognition of those in vulnerable situations by institutions and nations. On the other hand, it is not clear what the barriers are that arise from the lack of recognition and prevent such representativeness in events and discussions of climate, which generates the next opportunity:

G34. Identify the barriers that prevent the individuals' participation in climate policy discussions and definitions and how best to overcome them, both nationally and internationally, to ensure climate justice.

The second theme regarding Political Freedom relates to the role of democracy, through which individuals can challenge the adaptation and mitigation actions adopted by their governments as well as carry out demonstrations in favour of climate-change prevention. McKinney and Fulkerson (2015) show that there is a positive relationship between democracy and forest protection and that there is a negative relationship between democracy and loss of biocapacity. Sovacool et al. (2017) deal with demonstrations against Donald Trump's candidacy during the US presidential election in 2017 motivated by the context of climate change. Platje and Kampen (2016) argue that although decisions require more time in democracies than in authoritarian regimes, they enable a strengthening of mitigation actions and resilience to climate change. Shaw (2016) states that subjects alienated from political discussions do not identify climate mitigation problems nor share the blame with their governments because they do not exercise their right to protest against the adopted policies.

It is seen that the literature explores the theme of democracy and climate justice in order to report its benefits to society. However, such popular demonstrations are not yet unanimous in countries with different cultures, which makes it important to understand how to encourage individuals to exercise their political freedom and how much this popular participation has generated an effect in the actions of adaptation to and mitigation of climate changes. Thus, the opportunity identified in the literature were as follows:

G35. How can the participation of the individual in the definitions of climate policies in democracies be encouraged?

G36. What is the effectiveness of popular participation in the adoption of climate-change mitigation and adaptation actions?

5.3.5. Transparency guarantees

Finally, there are also the Transparency Guarantees, which are the least frequent in the 53 articles analysed. The first line of analysis of this type of freedom deals with transparency between governments, the UN, and individuals. Brincat (2015) reports that in climate negotiations at the COPs, the lack of transparency in some processes shows how some nations are excluded from preparing mitigation documents. Schmitdt and Schäfer (2015) have

identified in the news published in newspapers the favouring by the government of some industrial sectors to the detriment of the market players who search for innovations and economic prosperity. Cameron and Limon (2012) argue that greater transparency in governments can lead to a better understanding of developing countries' ability to adapt to climate change.

Despite the reports of the need for transparency between institutions and individuals, it is not yet clear how this transparency can improve people's understanding of their situation or how it can promote popular participation in climate policy discussions. And once the fact is observed at the micro level (nationally), there is also a need to understand how climate negotiations can be favoured if there is more transparency in the discussions on climate change. Thus, the following opportunities in the literature are identified:

G37. Does the guarantee of transparency contribute to the strengthening of popular participation in climate discussions?

G38. With regard to climate discussions at the global level, can transparency improve the negotiations and definition of mitigation actions?

The second line identified for the freedom Transparency Guarantees focuses on acts related to corruption. Sheller and León (2016) indicate that there is evidence of corruption in the assistance given by national governments to families affected by floods. Barrett (2014) argues that there is a greater need for transparency in the use of the resources from climate funds; statistically less vulnerable areas of the country receive a greater amount of financial resources, a fact that, according to the author, can be explained by political support. Sovacool et al. (2017) report the case of a car company that supports energy actions of low environmental impact but was caught in a fraud concerning the alteration of software to measure CO_2 emissions present in the brand's cars. Finally, Otto et al. (2017) explain that after climate disasters, aid distributions can generate grievances, and sometimes their disruption is related to events of violence and increased conflict.

In these studies, the argument that corruption weakens the individual's ability to adapt to climate change is presented. However, it is seen that the literature still lacks specific reports on how corruption and lack of trust weaken the individual's action and how these problems can be eliminated. Thus, we identify the following opportunity in the literature:

G39. Look for reports in which corruption cases have affected the individual's ability to adapt to and mitigate climate change.

G40. What is the influence of corruption and lack of confidence on ensuring climate justice?

5.3.6. Climate justice and the role of women

Finally, a theme cross-cutting all freedoms previously discussed is the issue of gender difference and the defence of women's basic rights. Within the scope of analysis of climate-change mitigation and adaptation and the freedoms of the individuals, the authors seek to understand the impacts of climate change on women's capabilities and what they need to adapt to the climate change.

Regarding Economic Facilities, Kortetmäki (2016) states that the lack of paying jobs for women hampers their economic evaluation and consequently makes them more vulnerable to climate change. To minimize this effect, Ahmed (2016) reports the role of women in the REDD + programme in Sudan as a way to bring them into the market.

With regard to Social Opportunities, in turn, the need to guarantee information and education to vulnerable women is highlighted. In this direction, Gibbons (2014) states that a higher level of education of mothers increases the chances of survival of their children. Jafry (2016) explains that education is key to improving the socioeconomic situation of women. Bendlin (2014) argues that women are responsible for caring for the elderly and sick, which distracts them from education and more lucrative jobs, exposing them to greater climate risks.

With regard to Protective Security, Nicholas and Breakley (2017) report that women who seek water have a greater degree of exposure to extreme weather events, reducing their actions for adaptation to and mitigation of climate change. In this case, Figueiredo and Perkins (2013) argue that the state's support for women in developing countries should include access to water for their survival.

Regarding the Political Freedoms, Agostino and Lizarde (2012) state the need for greater participation of women in the definition of climate policies and in the administration of resources for actions to adapt to the climate. McKinney and Fulkerson (2015) note that the political status of women is important as it tends to be used to achieve sustainability goals.

Finally, with regard to the freedom Transparency Guarantees, the papers argue that the female image is often linked to actions of a climatic nature, which may actually hide the lack of transparency in the relationship between social actors. As an example, Sovacool et al. (2017) describes the use of the image of two women in an oil company advertising campaign that applied legal proceedings to widows and children for having sought to exercise their basic rights in Nigeria.

Thus, it is verified that the literature seeks to highlight the importance of women's participation in climate-change adaptation and mitigation actions. However, the studies have not yet shown how the female role can contribute to the achievement of climate justice. Therefore, it is believed that to raise awareness of the issue it is necessary to report and understand how women's participation makes climate action more effective.

G41. What is the influence of gender inequality on the adoption of climate-change adaptation and mitigation actions?

G42. To what extent does the increase in women's individual freedoms contribute to their ability to adapt to and mitigate climate change?

6. Conclusion

This article has explored, through a systematic review of the literature on the topic of climate justice and capabilities approach, the current lines of research on the theme that enabled the identification of future research opportunities.

From the organization of theoretical concepts that until now have seemed little synchronized, the present article could contribute by the organization of the theme and identification of the main relations in the area of study through a theoretical framework, which can contribute to the development of climate policies in both developed and developing countries and also to collaboration between academics and policymakers in global climate agreements. In this way, it is possible to understand how the relationship between the capabilities approach and climate justice can support human development policies and at the same time guarantee to the individual the ability to adapt to and mitigate climate change.

Some implications can also be highlighted for the practitioner in management and public administration areas. For example, to take actions to reach the Sustainable Development Goals (SDGs) defined by the UN, developing nations and their cities can explore the relationship between the SDG and human development and, at the

same time, promote climate justice by increasing the individual capability to have a decent green job, to participate in climate debate policies, to access clean water, to have opportunities to access education and medical assistance, and to have other freedoms.

After categorizing the 53 articles selected and carrying out bibliometric analyses, it was possible to identify 42 research opportunities related to the categories present in the scope of paper analysis. These opportunities (gaps) are summarized in Table 10.

Results were also identified that can support the advance of future researches on the theme. These results show:

- A concentration of European and North American researchers in the publications on the subject of climate justice, indicating the presence of research centres and possibilities for new partnerships on the theme;
- A greater frequency of studies aimed at understanding adaptation actions compared to mitigation actions, which may indicate greater ease of obtaining evidence about the effects of climate change on vulnerable individuals;
- The possibility of using individual freedoms based on capabilities approach as a way of assessing climate justice, using them as indicators of the effects of adaptation and mitigation actions on climate change;
- Identification of the cross-cutting theme that deals with gender and climate justice, indicating the possibilities of actions that contribute to increases of women's capability in the context of climate change.

Table 10
Summary of opportunities raised at work.

Number	Opportunity
1	Improve definitions and delimitations for the climate justice theme as a way of supporting new empirical and theoretical studies in the area.
2	Promote research on climate justice and capabilities in developing and underdeveloped countries;
3	Encourage the exchange of researchers from developing countries to developed countries in order to enrich the field of study on climate justice.
4	To monitor the progress in the definition of concepts on climate justice in order to help future researchers to find journals that have scope for the communication of research on the theme.
5	Understand and relate other perspectives of analysis with the concepts of human development that are not only those that aim at guaranteeing basic rights to the individual.
6	Promote studies on mitigation actions as a way to guarantee climate justice and increase the capability of the individual in the context of climate change.
7	Report evidences of the adoption of adaptation and mitigation actions to climate from both global and national/regional perspectives.
8	Understand whether or not there is a difference of importance in the types of freedoms for the promotion of climate justice.
9	Report cases where the Basic Rights perspective is used to analyse adaptation and mitigation actions to climate change, verifying if the consequences of both actions are similar to the freedom of the individual.
10	Identify the differences and similarities in the adoption of ***adaptation*** actions in developed and developing countries (macro level), verifying which adjustments are made in this type of action to achieve climate justice in the various regions of the countries (micro level).
11	Identify the differences and similarities in the adoption of ***mitigation*** actions in developed and developing countries (macro level), verifying which adjustments are made in this type of action to achieve climate justice in the various regions of the countries (micro level).
12	Promote further studies on the effects of political freedoms and transparency guarantee on adaptation actions.
13	How does the adopting of adaptation and mitigation actions take place in order to guarantee basic rights to individuals in a nation?
14	Do the effects of such actions overlap or not, considering their joint adoption?
15	Is there a pattern of adaptation actions to climate change that should be prioritized in developing countries?
16	Should the same adaptation actions be prioritized or should they be adapted to the context of developed countries?
17	Intensify and apply different quantitative methods in order to evaluate and understand the effectiveness and efficiency of climate adaptation actions as well as the characteristics of the community/region/country benefited.
18	Is it possible to use mixed methods to evidence adaptation actions to climate change?
19	How to adopt climate change adaptation actions so that they are aligned with UN human development guidelines and goals to ensure the needs of communities/individuals in different countries around the world?
20	How to promote mitigation actions in a national and global level, respecting and guaranteeing the capabilities of individuals for a full life and giving them the opportunity of making less polluting choices?
21	Look for specific cases of mitigation actions that ensure climate justice for the most vulnerable individuals in both developed and developing countries.
22	Search for case reports on how job creation occurred through the adoption of renewable energy in both developed and developing countries.
23	Search for case reports on how this freedom can contribute to increase the capability of the individual to save and choose their energy source and, consequently, be a mitigating agent for climate change.
24	How can the economic development of a nation contribute to increasing the ability of the most vulnerable individuals to adapt to climate change?
25	Why does economic freedom take priority over other types of freedoms when analyzing migration?
26	Does the individual who has access to drinking water, safe housing, and healthcare make better choices about adopting climate-adaptive actions or remains passive for receiving such opportunities?
27	How should the social guarantee policies be implemented for individuals and what is the effectiveness in reducing their vulnerability to climate change?
28	Report more cases where access to education, infrastructure and information has increased the individual's ability to adapt and mitigate to climate change.
29	Is there a causal relationship between the choices of the individual based on his or her education opportunities, infrastructure and information, and search for climate justice?
30	Has protective security related to financial resources had a positive impact on the survival of climate vulnerable individuals?
31	How effective is this kind of freedom for climate adaptation actions?
32	Is the protective security of water, shelter, and energy more effective than that one related to financial resources for the survival of the vulnerable individual?
33	Should developed countries promote the transfer and implementation of basic resources to ensure climate justice for vulnerable individuals in developing nations or should they continue to transfer financial resources to climate funds?
34	Identify the barriers that prevent the individuals' participation in climate policy discussions and definitions and how best to overcome them, both nationally and internationally, to ensure climate justice.
35	How to encourage the participation of the individual in the definitions of climate policies in democracies?
36	What is the effectiveness of popular participation in the adoption of mitigation and adaptation actions to climate change?
37	Does the guarantee of transparency contribute to the strengthening of popular participation in climate discussions?
38	For climate discussions at the global level, can transparency improve the negotiations and the definition of mitigation actions?
39	Look for reports in which corruption cases have affected the individual's ability to adapt and mitigate to climate change.
40	What is the influence of corruption and lack of confidence in ensuring climate justice?
41	What is the influence of gender inequality in the adoption of climate adaptation and mitigation actions?
42	To what extent does the increase in women's individual freedoms contribute to their ability to adapt and mitigate climate change?

Even though the study has been performed in a systematic way, limitations on the choice of keywords may have led to fewer papers being returned than the total number in the literature. Thus, it is possible that some papers are not included in the selection made in this study, but this does not downplay their importance. In addition, some actions to mitigate and adapt to climate change that were published prior to the proposition of the term climate justice were not selected because they were not part of the scope of this research, although they could be seen as part of the concept of climate justice.

Appendix

Table 11 contains a brief summary of the 53 articles analysed in this study.

Table 11
Summary of articles selected in the study

Article	Summary
Abate (2010)	The Public opinion as a factor of pressure on legislators and judges and the consequence of benefiting people vulnerable to climate change.
Agostino amd Lizarde (2012)	The quest for basic rights of women who suffer from climate change becomes necessary and must be grounded in women's empowerment principles.
Ahmed (2016)	The objective of the article is to present evidence of the female situation in the issues of climate justice in Sudan, as well as the role of programs such as REDD + for women acting in climate issues.
Baptiste and Kinlocke (2016)	The study shows that there are differences between several social groups in the fishing activity, having biophysical, social, economic and material aspects as variables.
Barrett (2012)	Multiscale and interdisciplinary analysis on which aspects of climate justice should be taken into account for the distribution of climate funds for adaptation.
Barrett (2014)	This article analyzes the ways in which financial resources are distributed from the Climate Funds to developing or more vulnerable countries.
Bendlin (2014)	Analysis of the impacts of climate change on women, suggesting the guarantee of human rights for women and distributing the effects of climate policies more equally between genders.
Bernstein (2015)	In order to reach a fairer agreement in the climate discussions one must take into account the concept of climate justice based on principles of social justice for the guarantee of social welfare.
Brincat (2015)	Analysis of how the recognition theory and social justice can be applied to climate justice issues.
Brooks and Davoudi (2014)	Analysis of adaptations and mitigation actions to climate changes through distributive justice, well being and equity variations, illustrating different problems involving the individuals.
Bulkeley et al. (2013)	A qualitative study of how cities respond to climate change by analyzing climate justice issues, both for mitigation and adaptation actions.
Cameron and Limon (2012)	Examination of how the UN Human Rights Councils and their mechanisms can help climate change actions to advance, highlighting the difficulties in establishing basic rights and ensuring voice to the climate change most vulnerable countries.
Comim (2008)	It discusses increasing people's capabilities as a guarantee that they can adapt and mitigate climate change in both distributional and procedural terms.
Creutzig et al. (2014)	Analysis of the European energy sector, arguing that politics, economics and climate change are related mainly to normative issues about transition to low carbon economy and the definition of policies that increase climate justice.
Dietzel (2017)	The Paris Agreement is the focus of this study aiming at basic health rights, where some topics are identified as fragilities of the agreement: healthcare guarantee for individual, considerations of inappropriate emission targets, lack of participation of some countries in climate agreements, and poor commitment in agreements are among the highlights of the study.
Dreher and Voyer (2015)	News stories in Australia's newspapers show how people live on the islands, are in difficulty and need basic rights and the necessity of guaranteeing them climate justice.
Figueiredo and Perkins (2013)	The role of women in political and social discussions on climate change as agents for their local community development.
Finley-Brook and Holloman (2016)	Mechanisms to reduce CO_2 emissions are analysed with the aim of promoting increased participation of low-income people and how energy alternatives can favour them.
Forsyth (2014)	Discussions on climate justice should reassess the risks and solutions proposed for vulnerability reduction through mitigation actions and considering aspects of social justice.
Gibbons (2014)	UN programs, funds, legislation, state policies and climate debates should address the situation of children in order to guarantee to them living conditions when exposed to climate change.
Gough (2015)	The objective of this article is to analyse the concept of human need, arguing ethical questions for the satisfaction of universal human needs in terms of emission, distribution of actions and damages, obligations to establish climate funds, and finally, domestic justice that threatens each individual regardless of wealth.
Grineski et al. (2012)	Two case studies in which three events related to climate change are taken into account: ozone, heat and flood. For this the study analyzes independent variables, population density, schooling, absence of medical care and number of young children.
Gutierrez and LePrevost (2016)	Increased capability of people to adapt to climate change, because without healthcare, the rural population will be even more exposed to extreme events from climate change.
Jafry (2016)	In assessing the women situation in South Asian wheat plantations, there are reports of actions that can improve the current situation and the need for women to act in the context of climate change.
Johannessen (2013)	The article aims to evaluate the news related to the media in South Africa during COP 17 highlighting: political issues, lack of human rights news, green technologies as a solution to climate change and job creation, as well as the consequences of climate changes for women and children.
Kortetmäki (2016)	So that climate negotiations ensure climate justice, they must make the representativeness of populations and the recognition of differences between these populations more democratic.
Lewis (2016)	The importance of current generations to adopt mitigation and adaptation actions to climate change with the effect of guaranteeing basic rights for future generations as a form of climate justice.
Lyster (2017)	Criticism of financial resources transfers to vulnerable countries from UN climate agreements should take into account individuals' capabilities, especially in actions to adapt to climate change.
Mayne et al. (2017)	The study assesses climate justice in terms of international negotiations and energy policies in the UK, using rights and duties criteria, mitigation responsibilities and capabilities of different actors.
Mckinney and Fulkerson (2015)	Analysis of actions and impacts on women's climate change mitigation, reinforcing the need to expand their basic rights and actively participate in climate-related policy issues.
Meikle et al. (2016)	Ethical debate on issues of climate justice, from its definition to the accountability of climate change, through the evaluation of indigenous communities and industrialized nations.

(*continued on next page*)

Table 11 (*continued*)

Article	Summary
Newell and Mulvaney (2013)	It highlights the importance of energy for the human being and the current challenges to a fair transition that attends to its consequences. It seeks to guarantee the right of access to energy for those who do not have it, as well as the rights affected by fossil sources.
Nicholas and Breakey (2017)	The paper aims to analyse the contribution of the nurse profession to the achievement of climate justice, emphasizing the importance of this profession in discussions and establishment of climate policies, administration of bodies that seek to guarantee climate justice.
Otto et al. (2017)	The analysis of social vulnerability for climate change focusing on social groups (age, sex, etc.) in different places through study variables: health, safety, food and immigration.
Peeters et al. (2013)	The article analyzes that the theory of capabilities must be based on the agents; restrictions and possibilities of functioning as a way of guaranteeing human development in the context of climate change.
Platje and Kampen (2016)	Relations between rich and poor countries need to be reevaluated and climate issues addressed far beyond issues of economic and technological growth, even when creating a group of countries to fight climate changes.
Polack (2008)	It looks at the differentiation process of vulnerable groups to discriminate their vulnerability and which human rights should be guaranteed for each of the groups listed.
Popke et al. (2016)	The authors explore three variables to analyse climate justice in Jamaica: adaptation, resilience and vulnerability. Their focus is always on public policies that will ensure opportunities for small farmers to act in the market by selling their products, producing as big farmers with new technologies, and increasing their rights to create associations that strengthen their claims.
Running (2015)	The article analyzes the trade-off between protection of the environment and the willingness of the individual to contribute with his income to the maintenance of the climate on the planet.
Saab (2015)	Discussion on the use of genetically modified seed patents and how this situation can be analysed from the climate change perspective.
Schimidt and Schäfer (2015)	With the aim of analyzing speech patterns in newspapers in Germany, the United States and India, this paper identifies five standards: freedom and resilience, fairness through market mechanisms, global governance provision, global solidarity and economic growth.
Schlosberg (2012)	It explores the weaknesses of several theories and presents the capabilities approach as the basis for the definition of policies to adapt to climate change.
Schlosberg (2013)	The concepts of environmental justice are broad and can provide analyzes of inequality and illustrate conceptions of social justice, including climate justice.
Schlosberg and Collins (2014)	It articulates the concepts of environmental justice and its principles for the application in adaptation actions to climate change focusing on climate justice.
Schlosberg et al. (2017)	The objective of the article was to evaluate the political and social speech on climate change; which highlights the differences between the visions of the community and the government, and that it can be explained by the fact that the government emphasizes mapping and evaluation risk while the community is more concerned with social issues, focused on the capability of individuals.
Shaw (2016)	Rights, risks and responsibilities are present in climate change issues, supporting the need to ensure the capability of the individual, what risks and what is him or her exposed to, and the equal division of actions to fight climate change.
Sheller and León (2016)	The differences in capability between communities living in two lakes located on the border between the Dominican Republic and Haiti are a topic of discussion; How historical issues and the helplessness of populations make it difficult to achieve climate justice.
Skillington (2015)	Vulnerable people suffer from the loss of their freedoms after extreme weather events forcing them to emigrate. Alternatives to legitimate and guarantee their rights in other nations are discussed as a way to achieve climate justice.
Smith and Rhiney (2016)	The authors report a case study in which indigenous peoples of the Caribbean do not have the capability to mitigate and adapt to climate change. They exemplify the actions and context of the islands as a way of indicating that without government intervention, communities will not be able to foresee the extreme effects and events of climate change.
Sovacool et al. (2017)	Concepts of justice and climate ethics are present in the energy theme and can be seen as a source of information for decision-makers, highlighting the morality and fairness of the dimensions of production and their relation to well-being and equal rights in obtaining and using energy.
Vanderheiden (2016)	The examination of how justice can be applied in other scales and aspects of international climate policies, and how the concepts of climate justice can provide understanding for several established norms.
Wilson (2016)	This case presents issues related to agriculture and concepts of climate justice, once small farmers do not have enough resources to mitigate and adapt to climate change.
Zellentin (2015)	Focusing on the loss of culture with the disappearance of small islands in the Pacific, it seeks to guarantee human rights for the inhabitants of these islands that are threatened by climate change.

References

Abate, R.S., 2010. Public nuisance suits for the climate justice movement: the right thing and the right time. Wash. Law Rev. 85 (197), 198–254.

Adger, W.N., Butler, C., Walker-Springett, K., 2017. Moral reasoning in adaptation to climate change. Environ. Polit. 26 (3), 371–390.

Agostino, A., Lizarde, R., 2012. Gender and climate justice. Development 55 (1), 90–95.

Ahmed, M.E., 2016. A gender justice approach to eliminating Sudan's Savannah belt's vulnerability to climate change. International J. of Climate Change Strategies and Manag 8 (4), 539–558.

Anand, S., Ravallion, M., 1993. Human development in poor countries: on the role of private incomes and public services. J. Econ. Perspect. 7 (1), 133–150.

Baptiste, A.K., Kinlocke, R., 2016. We are not all the same!: comparative climate change vulnerabilities among Fishers in Old Harbour Bay, Jamaica. Geoforum 73, 47–59.

Barrett, S., 2012. The necessity of a multiscalar analysis of climate justice. Prog. Hum. Geogr. 37 (2), 215–233.

Barrett, S., 2014. Subnational climate justice? Adaptation finance distribution and climate vulnerability. World Dev. 58, 130–142.

Bell, D., 2011. Does anthropogenic climate change violate human rights? Crit. Rev. Int. Soc. Polit. Philos. 14 (2), 99–124.

Bendlin, L., 2014. Women's human rights in a changing climate: highlighting the distributive effects of climate policies. Camb. Rev. Int. Aff. 27 (4), 680–698.

Bernstein, A.R., 2015. Climate change and justice: a non-welfarist treaty negotiation framework. Ethics Pol. Environ. 18 (2), 123–145.

Blomfield, M., 2016. Historical use of the climate sink. Res. Publica 22 (1), 67–81.

Bocanegra-Valle, A., 2014. 'English is my default academic language': voices from LSP scholars publishing in a multilingual journal. J. Engl. Acad. Purp. 13, 65–77.

Brincat, S., 2015. Global Climate change justice: from Rawls' law of peoples to Honneth's conditions of freedom. Environ. Ethics 37 (3), 277–305.

Brooks, E., Davoudi, S., 2014. Climate justice and retrofitting for energy efficiency: examples from the UK and China. disP-The Plan. Rev. 50 (3), 101–110.

Bulkeley, H., Carmin, J., Broto, V.C., Edwards, G.A., Fuller, S., 2013. Climate justice and global cities: mapping the emerging discourses. Global Environ. Change 23 (5), 914–925.

Burkett, V.R., Suarez, A.G., Bindi, M., Conde, C., Mukerji, R., Prather, M.J., St Clair, A.L., Yohe, G.W., 2014. Point of departure. In: Field, C.B., Barros, V.R., Dokken, D.J., Mach, K.J., Mastrandrea, M.D., Bilir, T.E., Chatterjee, M., Ebi, K.L., Estrada, Y.O., Genova, R.C., Girma, B., Kissel, E.S., Levy, A.N., MacCracken, S., Mastrandrea, P.R., White, L.L. (Eds.), Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 169–194. http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf. (Accessed 21 June 2017).

Caney, S., 2014. Two kinds of climate justice: avoiding harm and sharing burdens. J. Polit. Philos. 22 (2), 125–149.

Cameron, E., Limon, M., 2012. Restoring the climate by realizing rights: the role of the international human rights system. Rev.. of Eur., Comparative & International Environ. Law 21 (3), 204–219.

Chatterton, P., Featherstone, D., Routledge, P., 2013. Articulating climate justice in

Copenhagen: antagonism, the commons, and solidarity. Antipode 45 (3), 602–620.
Comim, F., 2008. Climate injustice and development: a capability perspective. Development 51 (3), 344–349.
Costello, A., Abbas, M., Allen, A., Ball, S., Bell, S., Bellamy, R., Friel, S., Groce, N., Johnson, A., Kett, M., Lee, M., Levy, C., Maslin, M., McCoy, D., McGuire, B., Montgomery, H., Napier, D., Pagel, C., Patel, J., Puppim de Oliveira, J.A., Redclift, N., Rees, H., Rogger, D., Scott, J., Stephenson, J., Twigg, J., Wolff, J., Patterson, C., 2009. Managing the health effects of climate change. Lancet 373 (9676), 1693–1733.
Creutzig, F., Hedahl, M., Rydge, J., Szulecki, K., 2014. Challenging the European climate debate: can universal climate justice and economics be reconciled with particularistic politics? Glob. Policy 5 (s1), 6–14.
Dangelico, R.M., 2016. Green product innovation: where we are and where we are going. Bus. Strat. Environ. 25 (8), 560–576.
Dietzel, A., 2017. The paris agreement–protecting the human right to health? Glob. Policy 8 (3), 313–321.
Dreher, T., Voyer, M., 2015. Climate refugees or migrants? Contesting media frames on climate justice in the Pacific. Environ. Commun 9 (1), 58–76.
Figueiredo, P., Perkins, P.E., 2013. Women and water management in times of climate change: participatory and inclusive processes. J. Clean. Prod. 60, 188–194.
Finley-Brook, M., Holloman, E.L., 2016. Empowering energy justice. Int. J. Environ. Res. Publ. Health 13 (9), 926.
Forsyth, T., 2014. Climate justice is not just ice. Geoforum 54, 230–232.
Gardiner, S.M., 2017. The threat of intergenerational extortion: on the temptation to become the climate mafia, masquerading as an intergenerational Robin Hood. Can. J. Philos. 47 (2–3), 368–394.
Gibbons, E.D., 2014. Climate change, children's rights, and the pursuit of intergenerational climate justice. Health and Hum. Rights 16 (1), 19–31.
Gough, I., 2015. Climate change and sustainable welfare: the centrality of human needs. Camb. J. Econ. 39 (5), 1191–1214.
Grineski, S.E., Collins, T.W., Ford, P., Fitzgerald, R., Aldouri, R., Velázquez-Angulo, G., Romo Aguilar, M. de L., Lu, D., 2012. Climate change and environmental injustice in a bi-national context. Appl. Geogr. 33, 25–35.
Gutierrez, K.S., LePrevost, C.E., 2016. Climate justice in rural southeastern United States: a review of climate change impacts and effects on human health. Int. J. Environ. Res. Publ. Health 13 (2), 189.
Holz, C., Kartha, S., Athanasiou, T., 2018. Fairly sharing 1.5: national fair shares of a 1.5 C-compliant global mitigation effort. Int. Environ. Agreements Polit. Law Econ. 18 (1), 117–134.
Intergovernmental Panel on Climate Change (IPCC), 2014. In: Pachauri, R.K., Meyer, L.A. (Eds.), Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team. IPCC, Geneva, Switzerland, p. 151. http://www.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-Chap1_FINAL.pdf. (Accessed 21 June 2017).
Jabbour, C.J.C., Sobreiro, V.A., Jabbour, A.B.S., Campos, L.M.S., Mariano, E.B., Renwick, D.W.S., 2018. An analysis of the literature on humanitarian logistics and supply chain management: paving the way for future studies. Ann. Oper. Res. 1–19. https://doi.org/10.1007/s10479-017-2536-x.
Jafry, T., 2016. Making the case for gender sensitive climate policy–lessons from South Asia/IGP. International J. of Climate Change Strategies and Manag 8 (4), 559–577.
Johannessen, J., 2013. Climate change, poverty and climate justice in south African media: the case of COP17. S. Afr. J. Hum. Right. 29 (1), 32–60.
Kortetmäki, T., 2016. Reframing climate justice: a three-dimensional view on just climate negotiations. Ethics Pol. Environ. 19 (3), 320–334.
Lage Junior, M., Godinho Filho, M., 2010. Variations of the kanban system: literature review and classification. Int. J. Prod. Econ. 125 (1), 13–21.
Lewis, B., 2016. Human rights duties towards future generations and the potential for achieving climate justice. Neth. Q. Hum. Right. 34 (3), 206–226.
Lyster, R., 2017. Climate justice, adaptation and the Paris Agreement: a recipe for disasters? Environ. Polit. 26 (3), 438–458.
Mariano, E.B., Sobreiro, V.A., do Nascimento Rebelatto, D.A., 2015. Human development and data envelopment analysis: a structured literature review. Omega 54, 33–49.
Mary Robinson Foundation - Climate Justice (MRFCJ), 2018. Principles of Climate Justice. https://www.mrfcj.org/principles-of-climate-justice/. (Accessed 30 May 2018).
Mayne, R., Fawcett, T., Hyams, K., 2017. Climate justice and energy: applying international principles to UK residential energy policy. Local Environ. 22 (4), 393–409.
McKinney, L.A., Fulkerson, G.M., 2015. Gender equality and climate justice: a cross-national analysis. Soc. Justice Res. 28 (3), 293–317.
Meikle, M., Wilson, J., Jafry, T., 2016. Climate justice: between mammon and mother earth. International J. of Climate Change Strategies and Manag 8 (4), 488–504.
Newell, P., Mulvaney, D., 2013. The political economy of the 'just transition'. Geogr. J. 179 (2), 132–140.
Nicholas, P.K., Breakey, S., 2017. Climate change, climate justice, and environmental health: implications for the nursing profession. J. Nurs. Scholarsh. 49 (6), 606–616.
Norman, E.S., 2017. Standing up for inherent rights: the role of indigenous-led activism in protecting sacred waters and ways of life. Soc. Nat. Resour. 30 (4), 537–553.
Obama, B., 2017. The irreversible momentum of clean energy. Science 355 (6321), 126–129.
Otto, I.M., Reckien, D., Reyer, C.P., Marcus, R., Le Masson, V., Jones, L., Norton, A., Serdeczny, O., 2017. Social vulnerability to climate change: a review of concepts and evidence. Reg. Environ. Change 17 (6), 1651–1662.
Ourbak, T., Tubiana, L., 2017. Changing the game: the Paris Agreement and the role of scientific communities. Clim. Pol. 17 (7), 819–824.
Parks, B.C., Roberts, J.T., 2006. Globalization, vulnerability to climate change, and perceived injustice. Soc. Nat. Resour. 19 (4), 337–355.
Peeters, W., Dirix, J., Sterckx, S., 2013. Putting sustainability into sustainable human development. J. of Hum. Development and Capabilities 14 (1), 58–76.
Platje, J., Kampen, R., 2016. Climate justice from a club good perspective. Inter. J. of Climate Change Strategies and Manag 8 (4), 520–538.
Polack, E., 2008. A right to adaptation: securing the participation of marginalised groups. IDS Bull. 39 (4), 16–23.
Popke, J., Curtis, S., Gamble, D.W., 2016. A social justice framing of climate change discourse and policy: adaptation, resilience and vulnerability in a Jamaican agricultural landscape. Geoforum 73, 70–80.
Roberts, J.T., 2009. The international dimension of climate justice and the need for international adaptation funding. Environ. Justice 2 (4), 185–190.
Running, K., 2015. Towards climate justice: how do the most vulnerable weigh environment–economy trade-offs? Soc. Sci. Res. 50, 217–228.
Saab, A., 2015. Climate-ready seeds and patent rights: a question of climate (in) justice? Glob. Jurist 15 (2), 219–235.
Scandrett, E., 2016. Climate justice: contested discourse and social transformation. Int. J. of Climate Change Strategies. and Manag 8 (4), 477–487.
Schlosberg, D., 2009. Capacity and capabilities: a response to the greenhouse development rights framework. Ethics Place Environ. 12 (3), 287–290.
Schlosberg, D., 2012. Climate justice and capabilities: a framework for adaptation policy. Ethics Int. Aff. 26 (4), 445–461.
Schlosberg, D., 2013. Theorising environmental justice: the expanding sphere of a discourse. Environ. Polit. 22 (1), 37–55.
Schlosberg, D., Collins, L.B., 2014. From environmental to climate justice: climate change and the discourse of environmental justice. Wiley Interdisciplinary Rev.: Climate Change 5 (3), 359–374.
Schlosberg, D., Collins, L.B., Niemeyer, S., 2017. Adaptation policy and community discourse: risk, vulnerability, and just transformation. Environ. Polit. 26 (3), 413–437.
Schmidt, A., Schäfer, M.S., 2015. Constructions of climate justice in German, Indian and US media. Climatic Change 133 (3), 535–549.
Scott, D.N., Smith, A.A., 2017. The abstract subject of the climate migrant: displaced by the rising tides of the green energy economy. J. Hum. Rights and the Environ 8 (1), 30–50.
Sen, A., 2001. Development as Freedom, first ed. Oxford Paperbacks, Oxford.
Seuring, S., Müller, M., 2008. From a literature review to a conceptual framework for sustainable supply chain management. J. Clean. Prod. 16 (15), 1699–1710.
Shaw, C., 2016. The role of rights, risks and responsibilities in the climate justice debate. International J. of Climate Change Strategies and Manag 8 (4), 505–519.
Sheller, M., León, Y.M., 2016. Uneven socio-ecologies of Hispaniola: asymmetric capabilities for climate adaptation in Haiti and the Dominican Republic. Geoforum 73, 32–46.
Skillington, T., 2015. Climate justice without freedom: assessing legal and political responses to climate change and forced migration. Eur. J. Soc. Theor 18 (3), 288–307.
Smith, R.A.J., Rhiney, K., 2016. Climate (in) justice, vulnerability and livelihoods in the Caribbean: the case of the indigenous Caribs in northeastern St. Vincent. Geoforum 73, 22–31.
Sovacool, B.K., 2013. Adaptation: the complexity of climate justice. Nat. Clim. Change 3 (11), 959–960.
Sovacool, B.K., Burke, M., Baker, L., Kotikalapudi, C.K., Wlokas, H., 2017. New frontiers and conceptual frameworks for energy justice. Energy Pol. 105, 677–691.
Tranfield, D., Denyer, D., Smart, P., 2003. Towards a methodology for developing evidence-informed management knowledge by means of systematic review. Br. J. Manag. 14 (3), 207–222.
United Nations Development Programme (UNDP), 2016. Human Development Report 2016: Human Development for Everyone. http://hdr.undp.org/sites/default/files/2016_human_development_report.pdf. (Accessed 21 June 2017).
Vanderheiden, S., 2016. Climate justice beyond international burden sharing. Midwest Stud. Philos. 40 (1), 27–42.
Wilson, M., 2016. Food and nutrition security policies in the Caribbean: challenging the corporate food regime? Geoforum 73, 60–69.
Zellentin, A., 2015. Climate justice, small island developing states & cultural loss. Climatic Change 133 (3), 491–498.